



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/600,687

06/20/2003

Philip D. MacKenzie

15

6727

7590 12/09/2008  
Ryan, Mason, & Lewis, LLP  
90 Forest Avenue  
Locust Valley, NY 11560

EXAMINER

TO, BAOTRAN N

ART UNIT

PAPER NUMBER

2435

MAIL DATE

DELIVERY MODE

12/09/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/600,687	<b>Applicant(s)</b> MACKENZIE, PHILIP D.	
	<b>Examiner</b> Bao tran N. To	<b>Art Unit</b> 2435	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09/17/2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/17/2008 has been entered.

This Office Action is in response to the Applicant's Amendment filed 08/18/2008.

Claims 1, 8, 9 and 16 are amended.

Claims 1-16 are pending.

### ***Response to Arguments***

2. Applicant's arguments filed 08/18/2008 have been fully considered but they are not persuasive.

Applicant argues that "no where do the two Faucher terminals "jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party holds," as recited in the independent claims" (Page 8 of Remarks).

Examiner respectfully disagrees. Faucher expressly discloses terminal A sends its certificate to terminal B and terminal B sends its certificate to terminal A. Terminal A decrypts and validates terminal B's certificates using the KCA public decryption key.

Art Unit: 2435

Similarly, terminal B decrypts and validates terminal A's certificate using the KCA public decryption key. Terminal A generates a secret random component  $R_{sub.a}$ , calculates the corresponding public component  $X_{sup.R.sbsp.a} \bmod P$ , encrypts it using the public encryption key  $PK_{sub.b}$  extracted from terminal B's certificate, and transmits  $PK_{sub.b} (X_{sup.R.sbsp.a} \bmod P)$  to terminal B. Terminal B generates a secret random component  $R_{sub.b}$ , calculates the corresponding public component  $X_{sup.R.sbsp.b} \bmod P$ , encrypts it using the public encryption key  $PK_{sub.a}$  extracted from terminal A's certificate and transmits  $PK_{sub.a} (X_{sup.R.sbsp.b} \bmod P)$  to terminal A. Terminal A receives and decrypts the message, obtains terminal B's public random component  $X_{sup.R.sbsp.b} \bmod P$  and exponentiates using its secret random component  $R_{sub.a}$ . The result modulus  $P$  is passed over the hash function to obtain the session key. Terminal B receives and decrypts the message from terminal A, obtains terminal A's public random component  $X_{sup.R.sbsp.a} \bmod P$  and exponentiates it using its secret random component  $R_{sub.b}$ . The result modulus  $P$  is passed over the hash function  $H$  to obtain the session key" (col. 8, lines 25-48).

As explained above, Faucher discloses that terminal A and terminal B have to exchange their information such as secret random component  $R_{sub.a}$  and secret random component  $R_{sub.b}$  to generate the shared information session key to use this session key to decrypt the ciphertext (col. 2, lines 14-20) which can read on the claim limitation jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party holds.

Applicant further argues, "Applicant maintains that the Examiner has failed to identify a cogent motivation for combining Cramer and Faucher in the manner proposed" (Page 9 of Remarks).

Examiner respectfully disagrees with this contention. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Cramer's reference and Faucher's reference are analogous arts. They both specifically disclose to how to secure communications by using the cryptographic system that can support the motivation to combine the Cramer's teaching with Faucher's teaching to establish the limitations of Claim 1 that provides secure communications conducted over insecure channels (Faucher, col. 1, lines 13-15). Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated Faucher's reference within Cramer to include wherein the assistance comprises an exchange of information between the first party device and the second party device separate from the sending of the ciphertext from the second party device to the first party device. One of ordinary skill in the art would have been motivated to do this

because it would secure communications conducted over insecure channels using public-keys method (Faucher, col. 1, lines 13-15).

Applicant further argues Cramer does not teach or suggest “exchange of information between the first party device and the second party device whereby at least a portion of the information is encrypted using an encryption technique such that one party encrypts information using its own public key and another party cannot read the information but can use the information to perform an operation” (Page 10 of Remarks).

Examiner respectfully disagrees. Faucher further discloses wherein the generating step further comprises an exchange of information between the first party device and the second party device whereby at least a portion of the information is encrypted using an encryption technique such that one party encrypts information using its own public key and another party can not read the information but can use the information to perform an operation” (Faucher, Figure 5, col. 8, lines 8-55).

Applicant further argues, Cramer does not disclose or suggest “Cramer discloses generating a share of a random secret; generating information representing encryptions of a form of the random secret, a share of a private key, and the ciphertext; transmitting at least the encrypted information to the second party device; and computing the plaintext based at least on the share of the random secret, the share of the private key, the ciphertext, and the data received from the second party device” (Page 10 of Remarks).

Examiner respectfully disagrees. Cramer discloses generating a share of a random secret (Col. 7, lines 11-19); generating information representing encryptions of a form of the random secret, a share of a private key, and the ciphertext (Col. 7 lines 10-27) {private key Z, and the random group}; transmitting at least the encrypted information to the second party device (Col. 6, lines 46-57); and computing the plaintext based at least on the share of the random secret, the share of the private key, the ciphertext, and the data received from the second party device (Figure 3, Col. 9 lines 25-50).

Applicant further argues that Cramer does not disclose or suggest “the first party device and the second party device additively share components of a private key” and “generation and exchange of proofs between the first party device and the second party device that serve to verify operations performed by each party” (Page 11 of Remarks).

Examiner respectfully disagrees. Cramer discloses “the first party device and the second party device additively share components of a private key” in (Col. 7 lines 10-15, and Col. 9 lines 35-40); and generation and exchange of proofs between the first party device and the second party device that serve to verify operations performed by each party” in (Col. 8 line 38 to Col. 9 line 23).

For at least the above reasons, the rejections for claims 1-16 are respectfully maintained.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 4-6, 8-9-10, 12-14, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cramer et al, (US Patent No. 6,697,488) hereinafter Cramer in view of Faucher (US Patent No. 5,515,441) hereinafter Faucher.

As per claims 1 and 9, Cramer discloses a method for use in a device associated with a first party for decrypting a ciphertext according to a Cramer-Shoup based encryption scheme (Col. 6 lines 10-15), the method comprising the steps of:

obtaining the ciphertext in the first party device sent from a device associated with a second party (Col. 8, lines 25-35, encrypted plaintext); and

generating in the first party device a plaintext corresponding to the ciphertext based on assistance from the second device, the plaintext representing a result of the decryption according to the Cramer-Shoup based encryption scheme (Col. 8 line 25 to Col. 10 line 5) { Section IV teaches a verification steps to check the received ciphertext. Section V teaches steps of decrypting the received and verified ciphertext with the assistance of the sender} (Cramer and Shoup cryptographic system invention).



Cramer does not disclose “wherein the assistance comprises an exchange of information between the first party device and the second party device separate from the sending of the ciphertext from the second party device to the first party device, such that the first party device and the second party device jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party hold, but such that either can decrypt the ciphertext alone.”

However, Faucher explicitly discloses wherein the assistance comprises an exchange of information between the first party device and the second party device separate from the sending of the ciphertext from the second party device to the first party device (col. 3, lines 5-50), such that the first party device and the second party device jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party hold, but such that either can decrypt the ciphertext alone (Figure 5, col. 8, lines 8-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated Faucher's reference within Cramer to include wherein the assistance comprises an exchange of information between the first party device and the second party device separate from the sending of the ciphertext from the second party device to the first party device, such that the first party device and the second party device jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party hold, but such that either can decrypt the ciphertext alone. One of ordinary skill in the art would have been motivated to do this because it would secure communications conducted over insecure channels using public-keys method (col. 1, lines 13-15).

As per claims 8 and 16, Cramer discloses a method for use in a device associated with a first party for assisting in decrypting a ciphertext according to a Cramer-Shoup based encryption scheme, the method comprising the steps of:

receiving a request generated in and transmitted by a second party device for the partial assistance *{the partial assistance is the steps to verify the ciphertext before going through the decryption process in section V}* of the first party device in decrypting the ciphertext according to the Cramer-Shoup based encryption scheme (Col. 8, line 38 – Col. 9, line 25); and

generating results in the first party device based on the partial assistance provided thereby for use in the second party device to complete decryption of the ciphertext” (Col. 8 line to Col. 10 line 5) { *Section IV teaches a verification steps to check the received ciphertext. Section V teaches steps of decrypting the received and verified ciphertext with the assistance of the sender*} (*Cramer and Shoup are the inventors of this prior art*) (Col. 8 line 25 to Col. 10 line 5).

Cramer does not disclose “wherein the assistance comprises an exchange of information between the first party device and the second party device separate from the sending of the ciphertext from the second party device to the first party device, such that the first party device and the second party device jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party hold, but such that either can decrypt the ciphertext alone.”

However, Faucher explicitly discloses wherein the assistance comprises an exchange of information between the first party device and the second party device separate from the sending of the ciphertext from the second party device to the first party device (col. 3, lines 5-50), such that the first party device and the second party device jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party hold, but such that either can decrypt the ciphertext alone (Figure 5, col. 8, lines 8-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated Faucher's reference within Cramer to include wherein the assistance comprises an exchange of information between the first party device and the second party device separate from the sending of the ciphertext from the second party device to the first party device, such that the first party device and the second party device jointly perform a decryption operation of the ciphertext by each respectively performing one or more subcomputations of the joint decryption operation based at least in part on respective partial shares of a key that each party hold, but such that either can decrypt the ciphertext alone. One of ordinary skill in the art would have been motivated to do this because it would secure communications conducted over insecure channels using public-keys method (col. 1, lines 13-15).

As per claims 2 and 10, Cramer and Faucher disclose the limitations of Claims 1 and 9. Faucher further discloses wherein the generating step further comprises an exchange of information between the first party device and the second party device whereby at least a portion of the information is encrypted using an encryption technique such that one party encrypts information using its own public key and another party can not read the information but can use the information to perform an operation" (Faucher, Figure 5, col. 8, lines 8-55).

As per claims 4 and 12, Cramer and Faucher disclose the limitations of Claims 1 and 9. Cramer further discloses wherein the generating step further comprises:

generating a share of a random secret (Col. 7, lines 11-19);

generating information representing encryptions of a form of the random secret, a share of a private key, and the ciphertext (Col. 7 lines 10-27) {private key Z, and the random group};

transmitting at least the encrypted information to the second party device (Col. 6, lines 46-57); and

computing the plaintext based at least on the share of the random secret, the share of the private key, the ciphertext, and the data received from the second party device (Figure 3, Col. 9 lines 25-50).

As per claims 5 and 13, Cramer and Faucher disclose the limitations of Claims 1 and 9. Cramer further discloses wherein the first party device and the second party device additively share components of a private key” in (Col. 7 lines 10-15, and Col. 9 lines 35-40).

As per claims 6 and 14, Cramer and Faucher disclose the limitations of Claims 1 and 9. Cramer further discloses wherein the generating step further comprises generation and exchange of proofs between the first party device and the second party device that serve to verify operations performed by each party” in (Col. 8 line 38 to Col. 9 line 23).

4. Claims 3, 7, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cramer and Faucher and further in view of Ronald Cramer et al, "Multiparty Computation from Threshold Homomorphic Encryption".

As per claims 3 and 11, Cramer and Faucher disclose the limitations of Claims 1 and 9. Cramer and Faucher do not disclose "wherein the generating step further comprises an exchange of information between the first party device and the second party device whereby at least a portion of the information is encrypted using an encryption technique having a homomorphic property."

However, Ronald Cramer discloses wherein the generating step further comprises an exchange of information between the first party device and the second party device whereby at least a portion of the information is encrypted using an encryption technique having a homomorphic property (page 18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated Ronald Cramer's reference within Cramer and Faucher to include the encryption technique having a homomorphic property. One of ordinary skill in the art would have been motivated to do this because it would secure communications conducted over insecure channels (col. 1, lines 13-15).

As per claims 7 and 15, Cramer and Faucher disclose the limitations of Claims 1 and 9. Cramer and Faucher do not disclose wherein the proofs are consistency proofs based on three-move SIGMA-protocols.

However, Ronald Cramer discloses wherein the proofs are consistency proofs based on three-move SIGMA-protocols the proofs are based on three move SIGMA. Protocols (page 13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated Ronald Cramer's reference within Cramer and Faucher to include the proofs are based on three move SIGMA. protocols. One of ordinary skill in the art would have been motivated to do this because it would secure communications conducted over insecure channels (col. 1, lines 13-15).

#### ***Contact Information***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Baotran N. To whose telephone number is (571)272-8156. The examiner can normally be reached on Monday-Friday from 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Y. Vu can be reached on 571-272-3859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2435

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/B. N. T./  
Examiner, Art Unit 2435  
/Kimyen Vu/  
Supervisory Patent Examiner, Art Unit 2435